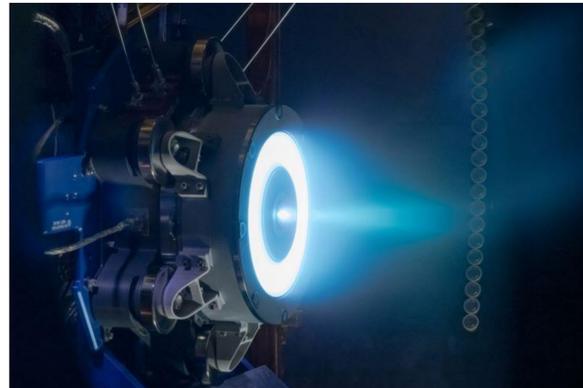


SSNB Ion Engine

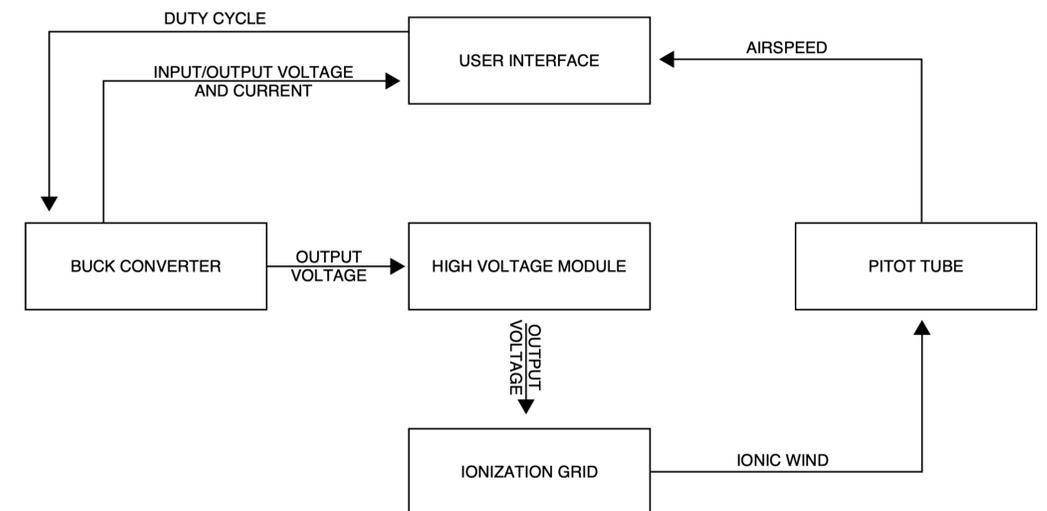


Project

- Traditional propulsion methods for spacecraft create limitations on mission life based on weight and fuel.
- Our project explores the application of particle ionization as a propulsion method for small very low earth orbit satellites.
- The SSNB Ion Engine utilizes a high voltage transformer to generate an ionization field that accelerates atmospheric particles to generate thrust.
- The power converter uses open loop controls to adjust engine output.



System



Methods

- An ionization grid was designed to guide the high voltage potential to generate corona discharge instead of arcs.
- A high voltage transformer was used to step up a low voltage power source to a high voltage power source.
- A low voltage buck converter was used to change the input to the high voltage supply, which in turn changed the output of the high voltage power source.
- Varying the output of the high voltage transformer resulted in a varying output of speed.
- Safety measures were included to prevent damage to the equipment and keep users safe.

Conclusion

- Measurable ionic wind was generated from the thruster.
- Learned methods for high load side switching in power converters.
- Exploration in more complex converter types may yield better efficiency.
- Higher voltage may yield greater acceleration.
- Research into fuel species other than air may yield better thrust for non-perpetual applications.

